Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended)

A magnetic resonance method of measuring the dilution of phase modulated spins in an object that contains protonated macromelecules, from which the macromolecular proton concentration involved in magnetization transfer can be calculated, ~~from two or more scans of an object with a magnetic resonance imaging device, comprising~~wherein the steps of:

- applying a first RF pulse of flip angle α_1 at a first time so as to generate a transverse magnetization in said object;
- applying a first magnetic field gradient along a predetermined direction in said object so as to produce a phase modulation of ^1H spins along the direction of the gradient;
- applying a second RF pulse of flip angle α_2 at a second time τ_1 seconds after said first time so as to flip the transverse magnetization into the longitudinal plane;
- applying a third RF pulse of flip angle α_3 at a third time $\tau_1+\tau_2$ seconds after said first time ~~so as to manipulate the~~

~~longitudinal stored magnetization or as to leave the longitudinal stored magnetization unaffected~~;

- applying a fourth RF pulse of flip angle α_4 at a fourth time $\tau_1+\tau_2+\tau_3$ seconds after said first time so as to flip the longitudinal stored magnetization into the transverse plane;
- applying a second magnetic field gradient along the same predetermined direction and with the same amplitude and duration as said first magnetic field gradient;
- detecting a stimulated echo at a fifth time.

2. (Canceled)

3. (currently amended)

A method according to claim 1 ~~or 2~~, wherein said third RF pulse is a composite RF pulse.

4. (currently amended)

A method according to claim 1 ~~claims 1 to 3~~, wherein said third RF pulse is applied with a resonance offset so as to saturate partly or fully the magnetization associated to the macromolecular pool.

5. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 4~~,

wherein said third RF pulse has a flip angle α_3 of 0°, and said steps are performed more than two times, and said fourth time is altered over several subsequent scans.

6. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 5~~, wherein said pulse sequence is a pulse sequence for multislice imaging.

7. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 6~~, wherein said pulse sequence incorporates an additional encoding gradient for 3D imaging.

8. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 7~~, wherein said fourth RF pulse is replaced by a train of RF pulses with a flip angle < 90° in order to acquire more than one line in k-space per repetition.

9. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 7~~, wherein said stimulated echo is sampled with a multi-shot or single-shot echo planar imaging technique.

10. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 9~~, wherein the object is a patient, and wherein the first RF pulse is synchronized using electrocardiographic gating or peripheral pulse gating.

11. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 10~~, wherein the object is a patient, comprising controlling the respiratory motion of the patient during application of the pulse sequence.

12. (currently amended)

A method according to claim 1 ~~any one of claims 1 to 11~~, comprising determining a longitudinal relaxation rate of said object in addition to the macremolecular proton concentration, whereas the longitudinal relaxation rate is calculated from the ~~sampled data, whereas~~stimulated echo and from a spin echo that is sampled ~~additionally~~ at a time $2\tau_1$ after said first time.

13. (currently amended)

A method according to claim 1 ~~any of claims 1 to 12~~, wherein said object is the brain tissue of a patient and the

macromolecular proton concentration represents myelin density of said patient.

14. (currently amended)

A method according to claim 1 ~~any of claims 1 to 13~~, wherein said object is the myocardium of a patient and the macromolecular proton concentration reflects fiber density and structure and therefore tissue quality.

15. (currently amended)

A method according to claim 1 ~~any of claims 1 to 14~~, wherein the macromolecular proton pool is a contrast agent administered to the object and the macromolecular proton density reflects the concentration of the contrast agent.

16. (currently amended)

A magnetic resonance imaging device comprising a magnet (10) which generates a magnetic field about an object (14), gradient coils (18) which apply gradient pulses to said object (14), RF coils (24) which apply RF pulses to said object (14), driving circuitry (16, 22) which drives said gradient coils (18) and RF coils (24), receiving circuitry (30) which receives a signal from said object (14) in said magnetic field upon application of said gradient pulses and RF pulses, an arithmetic unit (34), a display device (36) for displaying said received and processed signals,

~~and~~ wherein a sequence control device (26) which controls said RF coils (24) to generate and apply a first RF pulse of flip angle α_1 at a first time so as to generate a transverse magnetization in said object (14) and a second RF pulse of flip angle α_2 at a second time τ_1 seconds after said first time so as to flip the transverse magnetization into the longitudinal plane and a third RF pulse of flip angle α_3 at a third time $\tau_1+\tau_2$ seconds after said first time and a fourth RF pulse of flip angle α_4 at a fourth time $\tau_1+\tau_2+\tau_3$ seconds after said first time so as to flip the longitudinal stored magnetization into the transverse plane, and which sequence control device (26) controls said gradient coils (18) to generate and apply ~~first and~~a first magnetic field gradient after the application of said first RF pulse and to generate and apply a second magnetic field gradients after the application of the forth RF pulse along a predetermined direction in said object (14) and which generates an image of a stimulated echo detected by said receiving circuitry (30) at a fifth time.

17. (Canceled)

18. (currently amended)

An imaging device according to claim 16~~ or 17~~, wherein said sequence control device (26) is programmed to perform said third RF pulse with a resonance offset so as to saturate partly or fully the magnetization associated to the macromolecular pool.

19. (currently amended)

An imaging device according to claim 16 ~~any one of claims 16 to 18~~, wherein said sequence control device (26) is programmed for altering said third time over several subsequent scans.

20. (currently amended)

An imaging device according to claim 16 ~~any one of claims 16 to 19~~, wherein said sequence control device (26) controls the gradient amplifiers (16) such as to sample a signal with a digitizer (32) according to the multi-shot or single-shot echo planar imaging technique.

21. (currently amended)

An imaging device according to claim 16, wherein ~~any one of claims 16 to 20, characterized in~~ a synchronization unit (42) connected with a device for measuring the electrocardiographic activity of a patient for synchronisation of the first RF pulse with the electrocardiographic activity of the patient.

22. (currently amended)

An imaging device according to claim 16, wherein ~~any one of claims 16 to 21, characterized in~~ a controlling device (44) for controlling a respiratory motion of a patient during application of the pulse sequence.

23. (currently amended)

An imaging device according to claim 16, ~~any one of claims 16 to 22~~, wherein said sequence control device (26) is additionally programmed to sample a spin echo at a time $2\tau_1$ after said first time, in order to determine the longitudinal relaxation rate.